EXHIBIT B

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(54)	**Title of the Invention:**	Vehicle Tire
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SPECIFICATION

1. Title of the Invention

Vehicle Tire

2. Claims

(1) A vehicle tire characterized by comprising a low-friction member in a region adjacent to a tread on a sidewall surface.

3. Detailed Description of the Invention

Field of Industrial Application

The present invention relates to vehicle tires that do not separate from the rim even if the tire is deformed as a result of insufficient air pressure or the like.

Prior Art

Vehicle tires for automobiles or the like are not only subject to tire separation as a result of bursting, but tires sometimes separate from the rim of the wheel as the result of excessive deformation of the tire.

For example, with a vehicle tire 1 for automobiles or the like as shown in FIG. 3, if the automobile makes a sudden turn, the tire 1 is excessively deformed.

The reason for this deformation of the tire 1 is as follows. That is to say, the centrifugal force resulting from the sudden turning of the automobile is received by way of frictional force between a tread 2 of the tire 1 and a road surface 6, and generates force and moment on the tire 1. Principally due to a component force, included in this force and moment, in a direction at right angles to the direction of forward motion of the automobile, in the plane that includes the road surface 6, a force F acts on the tire 1, as shown in FIG. 4, and causes deformation. In the figure, the left-hand side, as shown on paper, is the outer side of the turn. The force F results from the frictional force between the tire 1 and the road surface 6; if the force F is large, the deformation is great; and if a region of the sidewall of the tire 1, which is adjacent to the tread 2, contacts the road surface 6, further advancing the deformation, a bead 3 of the tire 1 may separate from a flange 5 of a rim 4.

If the air pressure in the tire is below the rated pressure, the tire readily deforms, and the tire separation occurs more readily.

If the tire separates, it becomes impossible to steer or drive, and the tire and the wheel

are damaged. Furthermore, in the case of tubeless tires, the air escapes.

Conventionally, in order to prevent such tire separation, a tire separation prevention ridge 7 was provided around the flange 5 of the rim 4, as shown in FIG. 5.

In addition, in terms of technology for reducing the damage to the tire, JP-63-093606-A discloses a sidewall shape that minimizes the rate of spread of cuts and scratches occurring in the sidewall.

Problems to Be Solved by the Invention

In the example of the prior art described above, the [wheel] shown in FIG. 5 is provided with a tire separation prevention ridge 7, which provides resistance, such that the bead 3 can less easily come off the flange 5, so as to reduce the likelihood of the tire 1 separating from the rim 4; but the following problems are present. That is to say, while this is suitable when the deformation of the tire 1 is slight, if that deformation is large, a sufficient [separation prevention] effect cannot be achieved. Specifically, there is a problem in that, if the air pressure in the tire 1 is below the rated pressure, the tire 1 is readily deformed, so it cannot be expected that the [separation prevention] effect will be great.

Furthermore, the [technology] disclosed in JP-63-093606-A prevents damage to tires resulting from the formation of cuts and scratches in the sidewall, which are attributable to tire deformation. But this is not suitable for preventing tire separation, and therefore it seems that similar problems are present.

The present invention is a reflection of that described above, thus an object thereof is to provide a tire wherein tire separation is prevented by causing the tire to slip, so as to lessen the force F, during sudden turns of the automobile or the like, and thereby reduce excessive deformation of the tire.

Means for Solving the Problems

In order to solve the aforementioned problems, the present invention is characterized by affixing a band-shaped, low-friction member 8 or forming this integrally with the material of the tire 1, at a position adjacent to the tread 2 on the surface of the sidewall.

Operation

By virtue of such a constitution, in such cases as when the automobile or the like turns suddenly or the like, if the tire 1 is deformed by the force F from the road surface 6 and it is greatly deformed, a portion of the sidewall of the tire 1 and the low-friction member 8 contact the road surface 6.

Then, as a result of the contact with the low-friction member 8, the frictional force between the tire 1 and the road surface 6 is reduced, and the tire 1 slips sideways.

At this time, because the frictional force between the tire 1 and the road surface 6 is reduced, the force F, which is generated by this frictional force, and which deforms the tire 1, is reduced, so that deformation of the tire 1 doesn't progress further.

Embodiments

Hereinafter one embodiment of the present invention is described in detail.

In FIG. 1, [reference numeral] 1 is a vehicle tire for an automobile or the like; 2 is a tread on the tire 1; and 3 is a bead. [Reference numeral] 4 is a rim of a wheel on which the tire 1 is mounted; and 5 is a flange on the rim 4 for mounting the tire 1.

On the surfaces on both the right side and the left side of the tire 1, between the tread 2 and the bead 3 (hereinafter, referred to as the sidewalls), band-shaped low-friction member 8, having frictional coefficients lower than that of the surfaces of both the sidewalls and the tread 2, are affixed in the lateral circumferential direction in regions adjacent to the tread 2. In terms of all the material characteristics of the low-friction member 8, this is an elastic material which does not degrade the cushioning of the sidewall of the tire 1. Instead of affixing the low-friction member 8, this may be formed integrally with the material of the tire 1 when the tire 1 is formed. The region in which the low-friction member 8 is affixed, or integrally formed, is a regions such that [the low-friction member 8] does not contact the road surface 6 under standard driving conditions, but if the air pressure in the tire is insufficient, the load is excessive, or unduly sudden turns are made on a high-friction road surface, or if these conditions are combined or the like, so the tire deformation is produced under conditions which facilitate deformation of tire 1, [the low-friction member 8] will contact the road surface 6 at the initial deformation stage.

Next, the operation of the embodiment having the constitution described above is described.

Under standard driving conditions, with the tire deformation that occurs when the tire

load is increased due to increasing the carrying load or the number of passengers, or when a sudden turn is made, only the tread 2 and the border between the sidewall and the tread 2, which is known as the shoulder, contact the ground, so that the low-friction member 8 does not contact the ground.

In cases such as, for example, those wherein the tire 1 has insufficient air pressure, or the load is excessive, or when these conditions are combined, if an unduly sudden turn is made under conditions that facilitate deformation of the tire 1, the tire 1 deforms in the manner shown in FIG. 2, as a result of the force F which is generated by the centrifugal force and frictional force between the tread 2 and the road surface 6. At his point, the magnitude of the force F is proportional to the magnitude of the frictional force between the surface of the tire 1, which is in contact with the ground, and the road surface 6.

Here, if this deformation increases so that the low-friction member 8 contacts the road surface 6, the frictional force between the surface of the tire 1, which is in contact with the ground, and the road surface 6 decreases, so that the tire 1 slips sideways. Thus, by reducing the frictional force between the surface of the tire 1, which is in contact with the ground, and the road surface 6, the force F that deforms the tire 1 is decreased, so that deformation of the tire 1 does not progress further, and the bead 3 of the tire 1 does not separate from the flange 5 of the rim 4.

Effects of the Invention

By virtue of the present invention as described in detail above, a band-shaped, low-friction member is provided along the lateral circumferential direction of the tire in region that is adjacent to the tread on the surface of the sidewall of the tire; and when the low-friction member contacts the ground as a result of deformation of the tire, the force F is reduced, allowing excessive deformation of the tire to be prevented.

Accordingly, tire separation is prevented, even in such cases as when sudden turns are made when the air pressure in the tire is insufficient for the rating.

Furthermore, when making inspections when work begins, it is possible to visually confirm excessive deformation of the tire due to insufficient air pressure in the tire or excessive loads or the like, by observing the extent to which the low-friction member is abraded as a result of contact with the ground.

Furthermore, it is possible [for the driver] to feel abnormal deformation of the tire while driving by way of the sideways slip of the vehicle that results from the low-friction member contacting the ground, whereby [the driver] is made aware that the air pressure in the tire is insufficient, the load is excessive, or the like.

Making the color of the low-friction member different than the color of the tire has the effect of improving the appearance and enhancing the design.

4. Brief Description of the Drawings

FIG. 1 is a lengthwise sectional view of one embodiment of the present invention; FIG. 2 is a lengthwise sectional view showing a situation in which tire in the embodiment shown in FIG. 1 is deformed; FIG. 3 is a lengthwise sectional view of a conventional tire and a rim; FIG. 4 is a lengthwise sectional view showing a situation in which the tire shown FIG. 3 is deformed; FIG. 5 is a lengthwise sectional view showing a situation in which a tire is mounted on a rim provided with a conventional tire separation prevention ridge.

1 tire
4 rim
8 low-friction member

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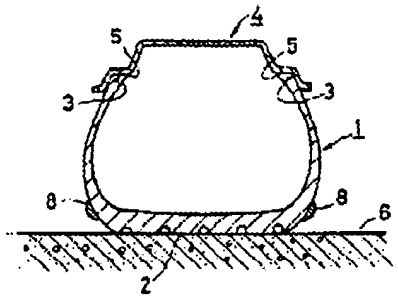
(and two other people)

FIG. 1



1 tire
4 rim
8 low-friction member

FIG. 2

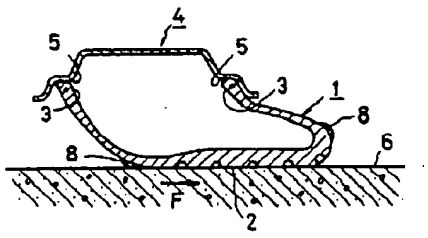


FIG. 3

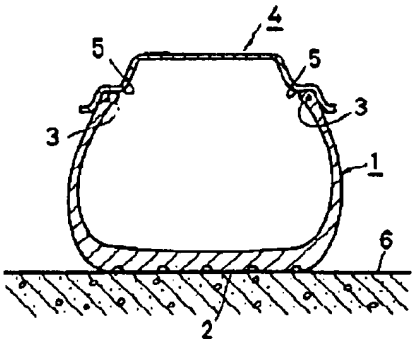


FIG. 4

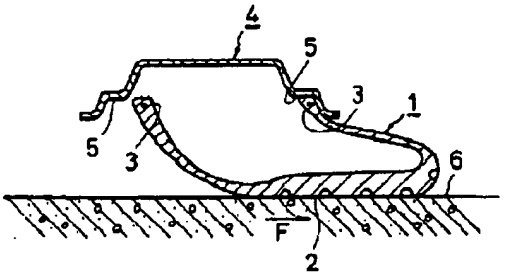


FIG. 5